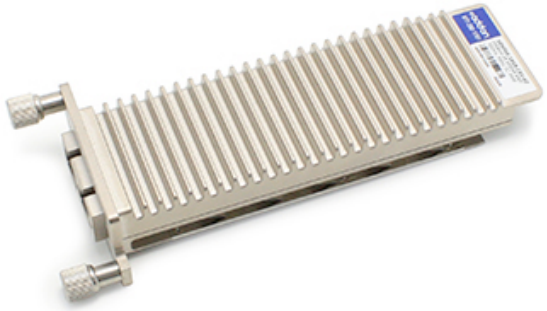
**XENPAK-10GB-CX4-AO**

10Gbs XENPAK Transceiver



**Features**

- Compatible with XENPAK MSA
- Support of IEEE 802.3ae 10GBASE-SR at 10.3125Gbps
- Transmission Distance up to 300m (MMF)
- Vertical Cavity Surface Emitting Laser at 850nm
- SC Duplex Optical Connector
- Hot Pluggable 70-PIN Connector with XAUI Electrical Interface
- Management and control via MDIO 2-wire interface
- Power Supply: +3.3V, APS (+1.2V)
- Diagnostic Optics Monitoring
- Temperature Range: 0~ 70 °C
- ROHS6 Compatible

**Applications**

- 10GE Ethernet switches and routers
- 10GE Core-routers
- 10GE Storage
- Other 10Gbps Ethernet Transmission System

**Product Description**

AddOn Computer's XENPAK-10GB-CX4-AO transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The SFP+ transceivers are high performance, cost effective modules supporting dual data-rate of 10Gbps and support distance up to 300m with MMF.

AddOn Computer's XENPAK transceivers are RoHS compliant and lead-free

**Pin Descriptions**

| Pin | Symbol | Name/Descriptions | Ref. |
|---|---|---|---|
| 1 | GND | Electrical Ground. | 1 |
| 2 | GND | Electrical Ground. | 1 |
| 3 | GND | Electrical Ground. | 1 |
| 4 | 5.0V | Power | 2 |
| 5 | 3.3V | Power | 2 |
| 6 | 3.3V | Power | 2 |
| 7 | APS =1.2V | Adaptive Power Supply. | 2 |
| 8 | APS =1.2V | Adaptive Power Supply. | 2 |
| 9 | LASI | Open Drain Compatible<br>10K-22K pull up on host.<br>Logic High: Normal Operation<br>Logic Low: LASI Asserted | 3 |
| 10 | RESET | Open Drain compatible.<br>10-22K pull-up on transceiver<br>Logic high = Normal operation<br>Logic low = Reset<br>Minimum reset assert time 1 ms | 3 |
| 11 | VEND SPECIFIC | Vendor Specific Pin.<br>Leave unconnected when not in use. | 6 |
| 12 | TX ON/OFF | Open Drain compatible.<br>10-22K pull-up on transceiver<br>Logic high = Transmitter On (capable)<br>Logic low = Transmitter Off (always) | 3 |
| 13 | RESERVED | Reserved | |
| 14 | MODE DETECT | Pulled low inside module through 1k | 3 |
| 15 | VEND SPECIFIC | Vendor Specific Pin.<br>Leave unconnected when not in use. | 6 |
| 16 | VEND SPECIFIC | Vendor Specific Pin.<br>Leave unconnected when not in use. | 6 |
| 17 | MDIO | Management Data IO | 3,4 |
| 18 | MDC | Management Data Clock | 3,4 |
| 19 | PRTAD4 | Port Address Bit 4 (Low = 0) | 3 |
| 20 | PRTAD3 | Port Address Bit 3 (Low = 0) | 3 |
| 21 | PRTAD2 | Port Address Bit 2 (Low = 0) | 3 |
| 22 | PRTAD1 | Port Address Bit 1 (Low = 0) | 3 |
| 23 | PRTAD0 | Port Address Bit 0 (Low = 0) | 3 |
| 24 | VEND SPECIFIC | Vendor Specific Pin.<br>Leave unconnected when not in use. | 6 |
| 25 | APS SET | Feedback input for APS | |

| | | | |
|---|---|---|---|
| 26 | RESERVED | Reserved for Avalanche Photodiode use. | 6 |
| 27 | APS SENSE | APS Sense Connection | |
| 28 | APS =1.2V | Adaptive Power Supply | 2 |
| 29 | APS =1.2V | Adaptive Power Supply | 2 |
| 30 | 3.3V | Power | 2 |
| 31 | 3.3V | Power | 2 |
| 32 | 5.0V | Power | 2 |
| 33 | GND | Electrical Ground | 1 |
| 34 | GND | Electrical Ground | 1 |
| 35 | GND | Electrical Ground | 1 |
| 36 | GND | Electrical Ground | 1 |
| 37 | GND | Electrical Ground | 1 |
| 38 | RESERVED | Reserved | |
| 39 | RESERVED | Reserved | |
| 40 | GND | Electrical Ground | 1 |
| 41 | RX LANE0+ | Module XAUI Output Lane 0+ | 5 |
| 42 | RX LANE0- | Module XAUI Output Lane 0- | 5 |
| 43 | GND | Electrical Ground | 1 |
| 44 | RX LANE1+ | Module XAUI Output Lane 1+ | 5 |
| 45 | RX LANE1- | Module XAUI Output Lane 1- | 5 |
| 46 | GND | Electrical Ground | 1 |
| 47 | RX LANE2+ | Module XAUI Output Lane 2+ | 5 |
| 48 | RX LANE2- | Module XAUI Output Lane 2- | 5 |
| 49 | GND | Electrical Ground | 1 |
| 50 | RX LANE3+ | Module XAUI Output Lane 3+ | 5 |
| 51 | RX LANE3- | Module XAUI Output Lane 3- | 5 |
| 52 | GND | Electrical Ground | 1 |
| 53 | GND | Electrical Ground | 1 |
| 54 | GND | Electrical Ground | 1 |
| 55 | TX LANE0+ | Module XAUI Input Lane 0+ | 5 |
| 56 | TX LANE0- | Module XAUI Input Lane 0- | 5 |
| 57 | GND | Electrical Ground | 1 |
| 58 | TX LANE1+ | Module XAUI Input Lane 1+ | 5 |
| 59 | TX LANE1- | Module XAUI Input Lane 1- | 5 |
| 60 | GND | Electrical Ground | 1 |

| | | | |
|---|---|---|---|
| 61 | TX LANE2+ | Module XAUI Input Lane 2+ | 5 |
| 62 | TX LANE2- | Module XAUI Input Lane 2- | 5 |
| 63 | GND | Electrical Ground | 1 |
| 64 | TX LANE3+ | Module XAUI Input Lane 3+ | 5 |
| 65 | TX LANE3 | Module XAUI Input Lane 3 | 5 |
| 66 | GND | Electrical Ground | 1 |
| 67 | RESERVED | Reserved | |
| 68 | RESERVED | Reserved | |
| 69 | GND | Electrical Ground | 1 |
| 70 | GND | Electrical Ground | 1 |

**Notes:**

1. Ground connections are common for TX and RX.
2. All connector contacts are rated at 0.5A nominal.
3. 1.2V CMOS compatible.
4. MDIO and MDC timing must comply with IEEE802.3ae, Clause 45.3.
5. XAUI output characteristics should comply with IEEE802.3ae Clause 47.
6. Transceivers will be MSA compliant when no signals are present on the vendor specific pins.

**Absolute Maximum Ratings**

| Parameter | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Maximum Supply Voltage | Vcc | -0.5 | 4.0 | V |
| Storage Temperature | TS | -40 | 85 | °C |
| Power Case Temperature | | 0 | 70 | °C |
| Adaptable Power Supply | Vapsense | 0 | 1.5 | V |

**Recommended Operating Conditions**

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Power Supply Voltage | $V_{CC3}$ | 3.13 | 3.30 | 3.47 | V |
| | $V_{APS}$ | 1.152 | 1.2 | 1.248 | |
| Power Supply Current | Icc | | | 300 | mA |
| Case Operating Temperature – Commercial | Tc | 0 | | 70 | °C |
| Power Dissipation | PD | | 1.7 | 2.4 | W |

**Signal Specification- Electrical**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| 1.2 V CMOS | | | | | | |
| Input High Voltage | VIL(MAX) | 120 | 600 | 850 | mV | |
| Input Low Voltage | VIH(MIN) | 90 | 100 | 110 | Ω | |
| Capacitance | | 2.0 | | Vcc+0.3 | V | |
| Pull Up Resistance | | Vee-0.3 | | 0.8 | V | |
| MDIO I/O | | | | | | |
| Output Low Voltage | VOL | -0.3 | | 0.2 | V | |
| Output Low Current | IOL | | | 4 | mA | |
| Input High Voltage | VIH | 0.84 | | 1.5 | V | |
| Input Low Voltage | VIL | -0.3 | | 0.36 | V | |
| Pull-up Supply Voltage | VPULL | 1.14 | 1.2 | 1.26 | | |
| Input Capacitance | CIN | | | 10 | Pf | |
| Load Capacitance | CLOD | | | 470 | Pf | |
| External Pull-up Resistance | EPULL | 200 | | | Ohm | |

**Optical Characteristics**

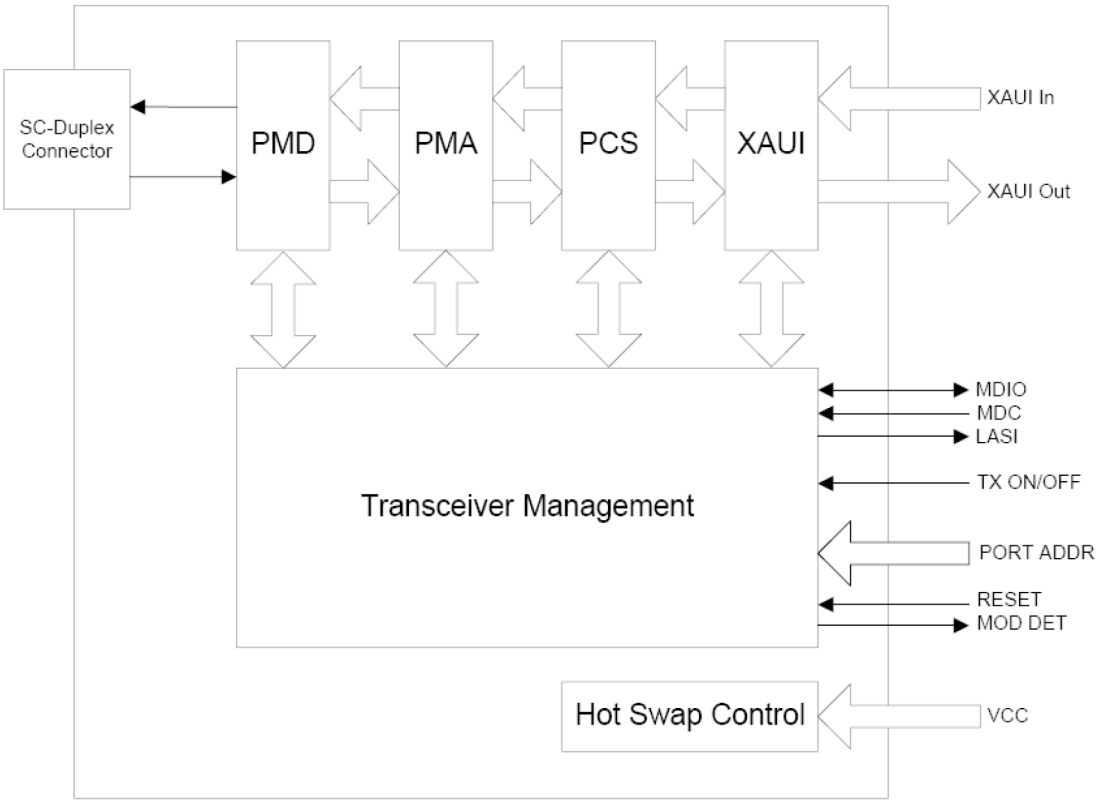
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| Transmitter | | | | | | |
| Operating Range | | | | 300 | m | |
| Operating Date Rate | | | 10.3125 | | Gb/s | |
| Average Optics Power | Po | -6.5 | | -1 | dBm | |
| Input Centre Wavelength | λ | 840 | 850 | 860 | nm | |
| Spectral Width | Δ λ | | 0.4 | 0.45 | dB | |
| Extinction Ratio | ER | 3.5 | | | | |
| Optical Modulation Amplitude | OMA | 525 | | | μW | |
| Transmitter and Dispersion Penalty | TDP | | | 3.2 | dB | |
| Receiver | | | | | | |
| Operating Date Rate | | | 10.3125 | | Gb/s | |
| Average Receiver Power | Po | -9.9 | | -1.0 | dBm | |
| Sensitivity in OMA | OMA0 | | | -11.1 | dBm | 1 |
| Stressed Sensitivity in OMA | OMAst | | | -7.5 | dBm | |

**Notes:**

1. Measured at 10.3125Gb/s,Non-framed PRBS2^31-1,NRZ.

**XAUI I/O Characteristics**

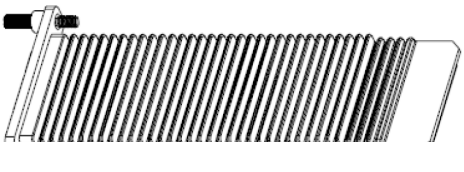
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| XAUI Date Rate | DR | | 3.125 | | Gb/s | |
| XAUI Baud Rate Tolerance | | -100 | | 100 | Ppm | |
| Differential Input Voltage Swing | | 220 | | 1600 | Mv | |
| Differential Output Voltage Swing | | 800 | | 1600 | mVp-p | |
| Differential Input Impedance | | 80 | 100 | 120 | Ω | |
| Total Output Jitter | TJXAUI | | | 0.35 | UI | |
| Total Deterministic Output Jitter | DJXAUI | | | 0.17 | UI | |

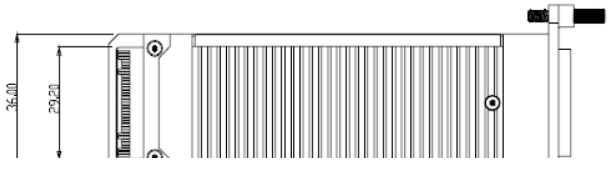



Functional Diagram of Typical XENPAK Style Transceiver

**Electrical Pin-out Details**

**Mechanical Dimensions**





**Regulatory Compliance**

XENPAK Transponder is designed to be Class I Laser safety compliant and is certified per the following standards:

| Parameter | Range | Accuracy | Calibration |
|---|---|---|---|
| Laser Safety | FDA | CDRH 21 CFR 1040 and Laser Notice No. 50 | 1120291-000 |
| Product Safety | UL | UL and CUL EN60950-2:2007 | WT10093765-D-E-E |
| Environmental Protection | SGS | RoHS Directive 2002/95/EC | GZ1001008706/CHEM |
| EMC | WALTEK | EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003 - | WT10093768-D-E-E |

**Contact Information**

AddOn Computer, Inc. is a leading supplier of Memory Upgrade, Network Transceivers and Network connectivity products to Channel Partners, Resellers and OEMs, with more than seventeen years of direct industry experience. AddOn Computer has been the exclusive supplier to Ingram Micro's "Memory Upgrades" program for the past nine years.

AddOn Computer maximizes profitable opportunities for our partners. Our ability to source product worldwide, ensures that our pricing will always be competitive. Offering turnkey solutions, AddOn Computer has forged a reputation as a solutions provider, delivering high quality, cost effective product in a timely and reliable manner.

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